Interior Nature Space

Zijie Nie

Final Project

Jenny E. Sabin, Jonathan Ochshorn

May 2019

FIRST EDITION

Abstract

Ecological architecture is not always concerned about techniques. Sometimes a good relationship between architecture and nature can also bring ecological effect in either mental or physical. In the past thousands of years, the most important thing for architects is to guide people's behaviors by giving space a corresponding shape and atmosphere. Even today, this fact does not change too much.[1] When exploring the relationship between architecture and nature, many architects tried different ways. In most cases, the border between architecture and nature is very clear. However, sometimes it can be rather ambiguous. The difference between architecture and nature will become too subtle to be distinguished. Some architects even try to use nature to build architecture, which is a reversal of past buildings. In the last thousands of years, people's thinking mode is taking nature as a site, and architecture should be built on that. They never thought nature itself can be a part of the architecture, which can also satisfy the demand for guiding people's behaviors by giving space a corresponding shape and atmosphere.

The buildings, which are between the definition of architecture and nature, can also be taken as ecological architecture. Their technical strategies are just more obscure and more ingenious. There are three kinds of ways to form an interior nature space—nature permeates into buildings, natural feeling inside buildings, and nature occupies buildings. They can also be defined as nature outside buildings, buildings simulate nature and nature inside buildings. One of them is also involved with mechanical techniques so that the building can change the lighting condition indoors.

In conclusion, this kind of discussion about the relationship between nature and architecture can be taken as another kind of passive ecological buildings. However, they are not intended to control the physical properties of buildings. They just introduce nature into buildings in a different way.

1 Amany Reghab, Hisham El-Shimy, Ghada Reghab, *GREEN ARCHITECTURE: A CONCEPT OF SUSTAINABILITY* (Procedia - Social and Behavioral Sciences, 2016), 779-781

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1. Introduction

When dealing with architecture in nature, people's first thought is always about how to avoid destroying nature, which is definitely right. However, it does not mean that architecture is a bad thing for nature. A good relationship between architecture and nature is that they can enhance each other's spatial characteristics. Buildings and nature are no longer individuals but become a whole. That means not only exterior space, but interior space should also have some kind of association with the natural environment. There are three kinds of interior nature space according to how nature space intervenes into interior space. Some of them may not be the real "nature space", but they can still give people a feeling of being inside nature.[2]

2. Nature Permeates Buildings

The borders between exterior nature space and interior space sometimes can be blurred. In this case, exterior space and interior space will wrap each other. In the macro scale, architecture stands in nature, so that exterior space will wrap interior space. In the micro scale, nature permeates into architecture, so that interior space will wrap exterior space. As a result, the process of walking in nature can be a process of entering architecture. Even though people are still in nature, they have already entered the border of architecture, which means they have been inside of architecture. In this way, architects are not trying to create natural space inside buildings, but they are introducing exterior nature space into buildings. This kind of exterior space can be more real. The change between inside and outside for people will be an unconscious behavior.

One of my summer semester's studios—"Abstraction+Realism", which was instructed by Kutan Ayata and Michael Young, combines plans of Gallery of Tomihiro Art Museum, Exeter Library, and Okurayama Apartment together by rotating, scaling, and repeating to create a future market. It is like a labyrinth, in which people can be lost and enjoy walking. In the

2 Bruno Marques, Carlos Rafael Loureiro, *Sustainable Architecture: Practices and Methods to Achieve Sustainability in Construction* (International Journal of Engineering and Technology, 2013), 223-225

future, all of their movements are realized by various vehicles. Therefore, this is the only chance for them to enjoy walking and lost in the market. However, even though the plan is complex, people can still figure out the way out by recognizing the courtyards which permeate into the building. The building is like “a city in the city”, which is much more human-friendly in scale. The courtyards permeating into it is the only connection between “the real city” and “the micro city”.

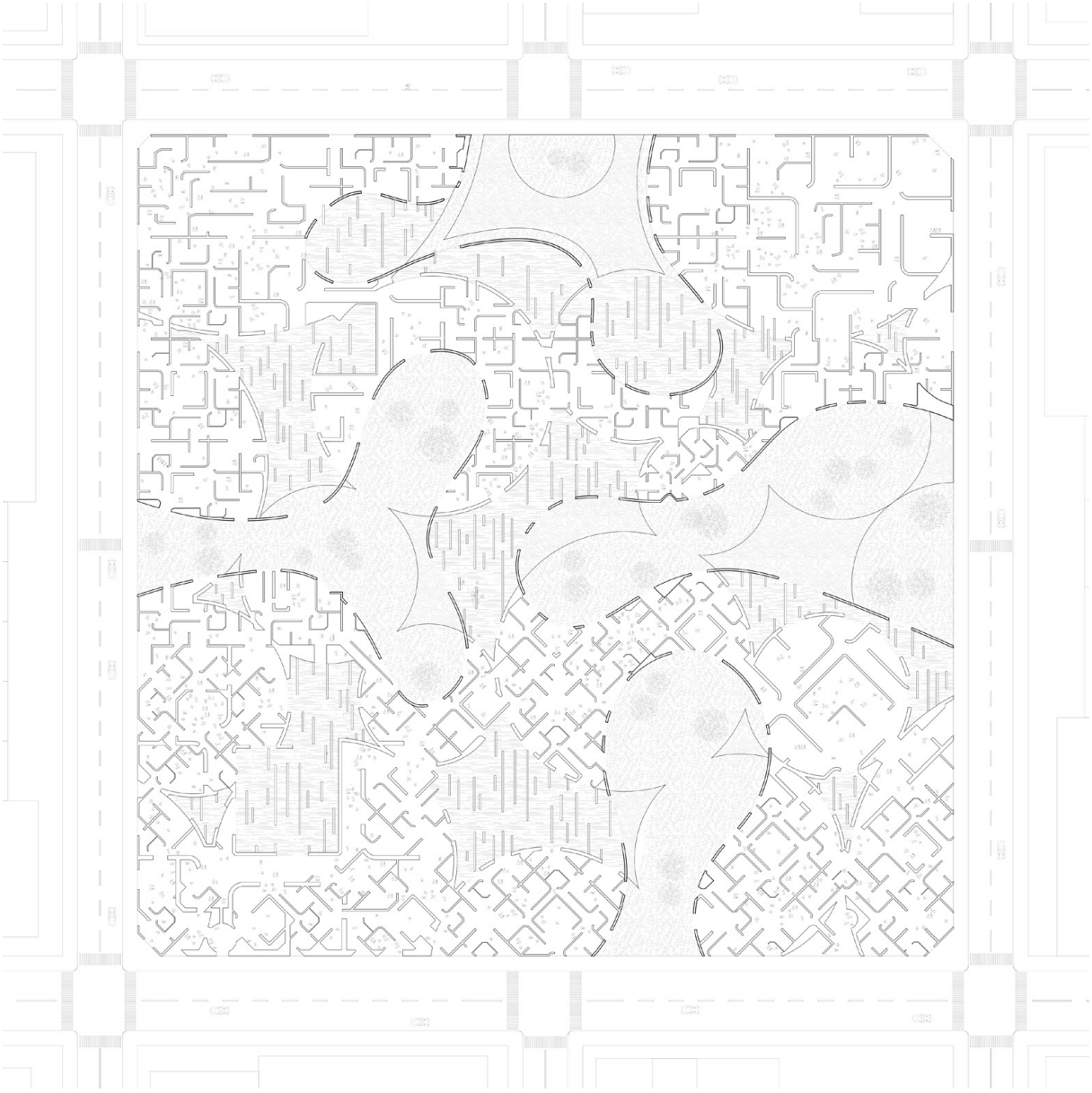


Fig.1. Lost in Market

3. Natural Feeling Inside Building

When nature space is completely inside buildings, one way is to create real nature space, another way is to create a space sharing a certain quality with nature space. In this way, even though people know they are inside of interior architecture space, they can still get the feeling of being in nature. This way is not trying to blur the physical borders between nature space and interior space but to blur interior spatial attribute itself. As a result, the experience of being in nature will be extracted as specific forms of interior space. It is different from put plants inside buildings. In that way, architecture and nature are still two different individuals. They are just overlapped in a physical way. However, when interior space becomes like nature space, it will be like a chemical reaction between architecture and nature. They finally create a totally new thing—a new space which can not be described as only interior space or natural space.[3]

In the last semester's optional studio "Material Matters", which was instrcuted by Alejandro Beals and Loreto Lyon, I reinterpret the space under willows as an iron-wire model. It looks like that the iron wires which are fixed by the thread above the basement can collapse at any time because of the elasticity. Therefore, I use curves to translate this model as a void, because the curves perfectly depict the tension inside the iron wires. Next, I use the wood structure to construct this void, because it also uses tension to support the roof. I put my building in a forest facing a lake. Although the construction of the building needs to destroy part of the forest, the new space inside the building can still give people a similar but new experience as standing under willows.

3 M. Aksoy, B. Bilgen, M. Baslo, *THOUGHTS AND IDEAS ON ECOLOGICAL SUSTAINABILITY AND THE REFLECTIONS ON ARCHITECTURE* (Int. Journal for Housing Science, 2013), 152-158

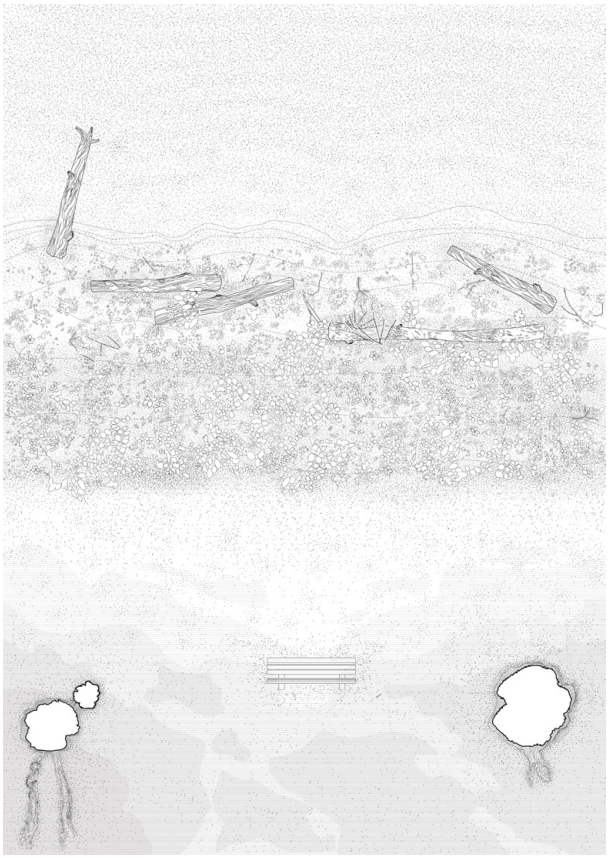


Fig.2. Willows Space Plan

Fig.3. Willows Space Section

The willows along the lake create a peaceful atmosphere. The seemingly heavy crowns are floating with the wind. The huge wickers almost touch the ground, but leave a thin line for people's sights. These contrasts give the scene a strong tension, making the space defined by the willows become much more peaceful.

The iron wires reinterpret the tension between the wickers and the ground.

Fig.4.
Iron-Wire Model

The curves perfectly depict the tension of the wickers.

Fig.5.
Void Model

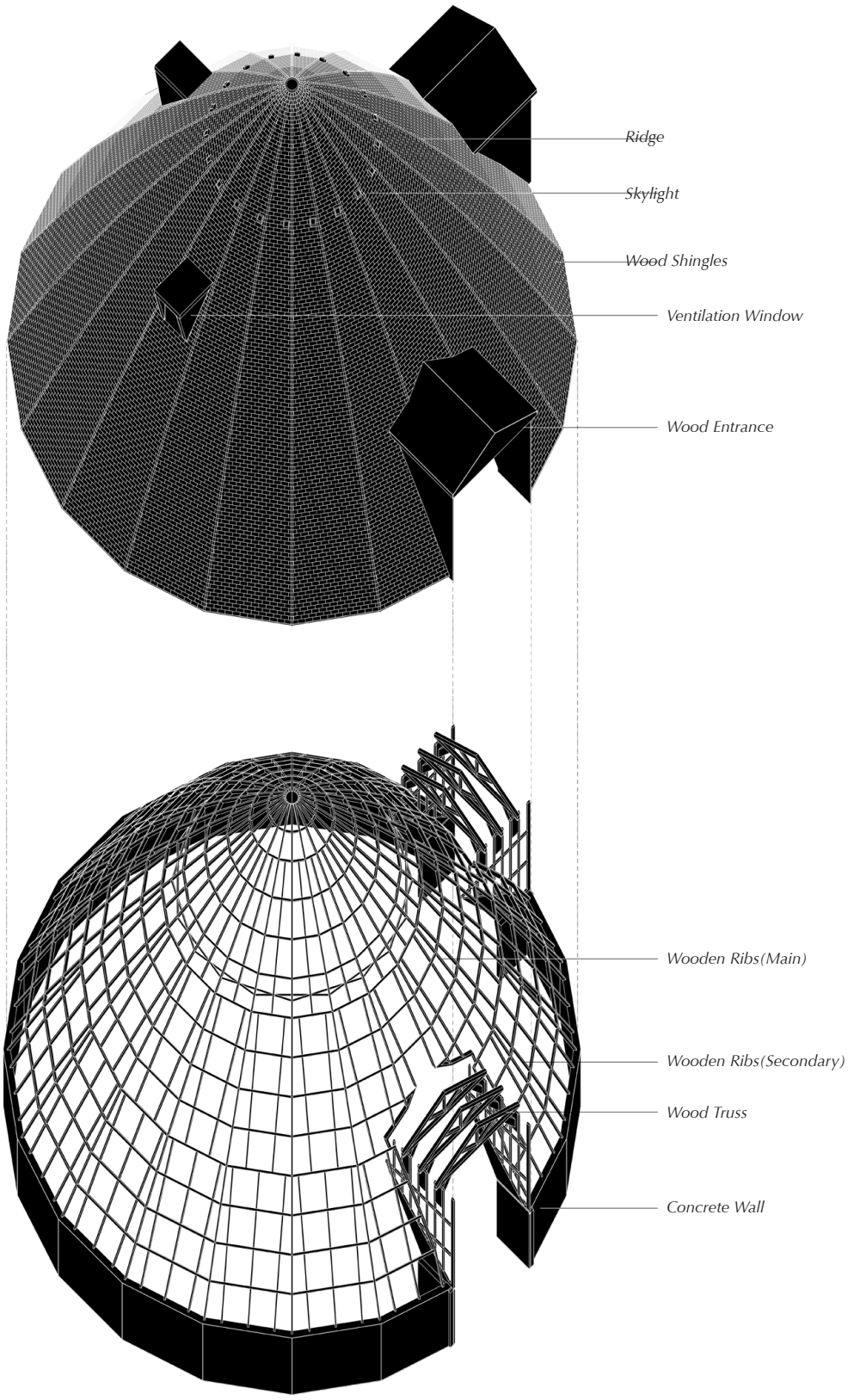


Fig.6. Salt Storage's Structure

Fig.7. Project's Model

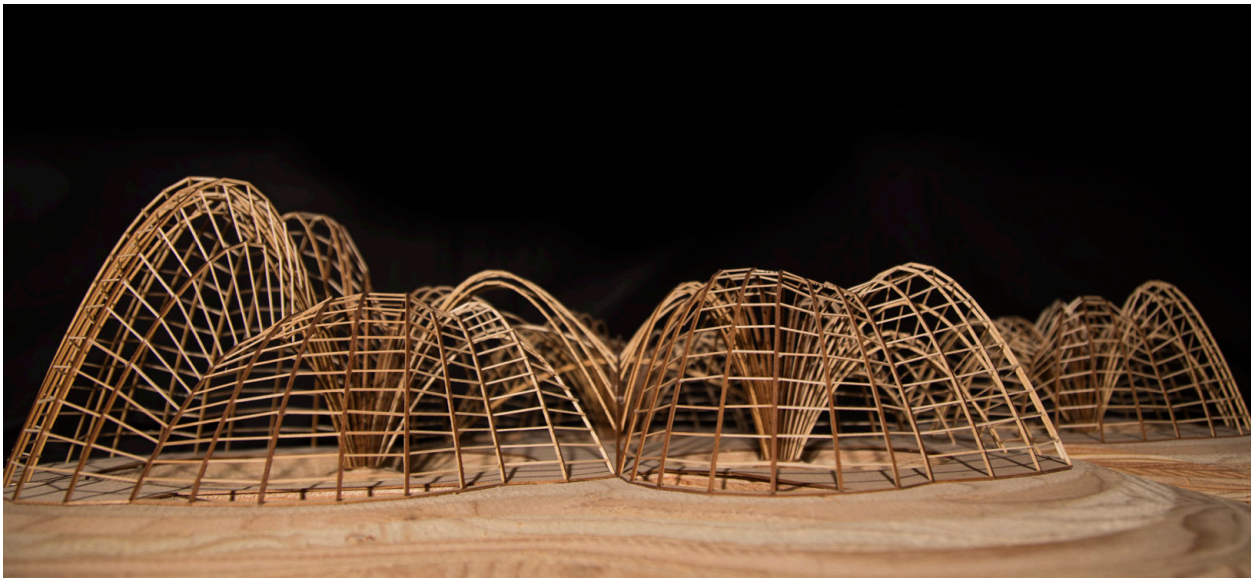


Fig.8. Project's Model

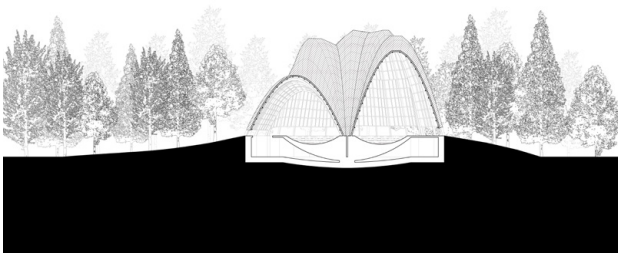


Fig.9. A-A Section

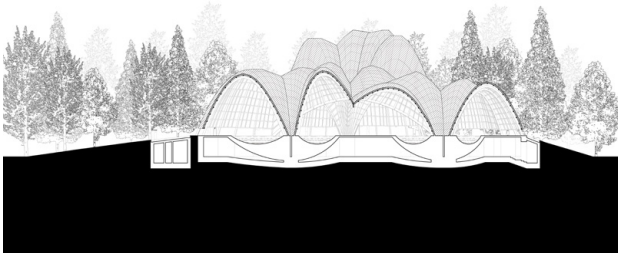


Fig.10. B-B Section

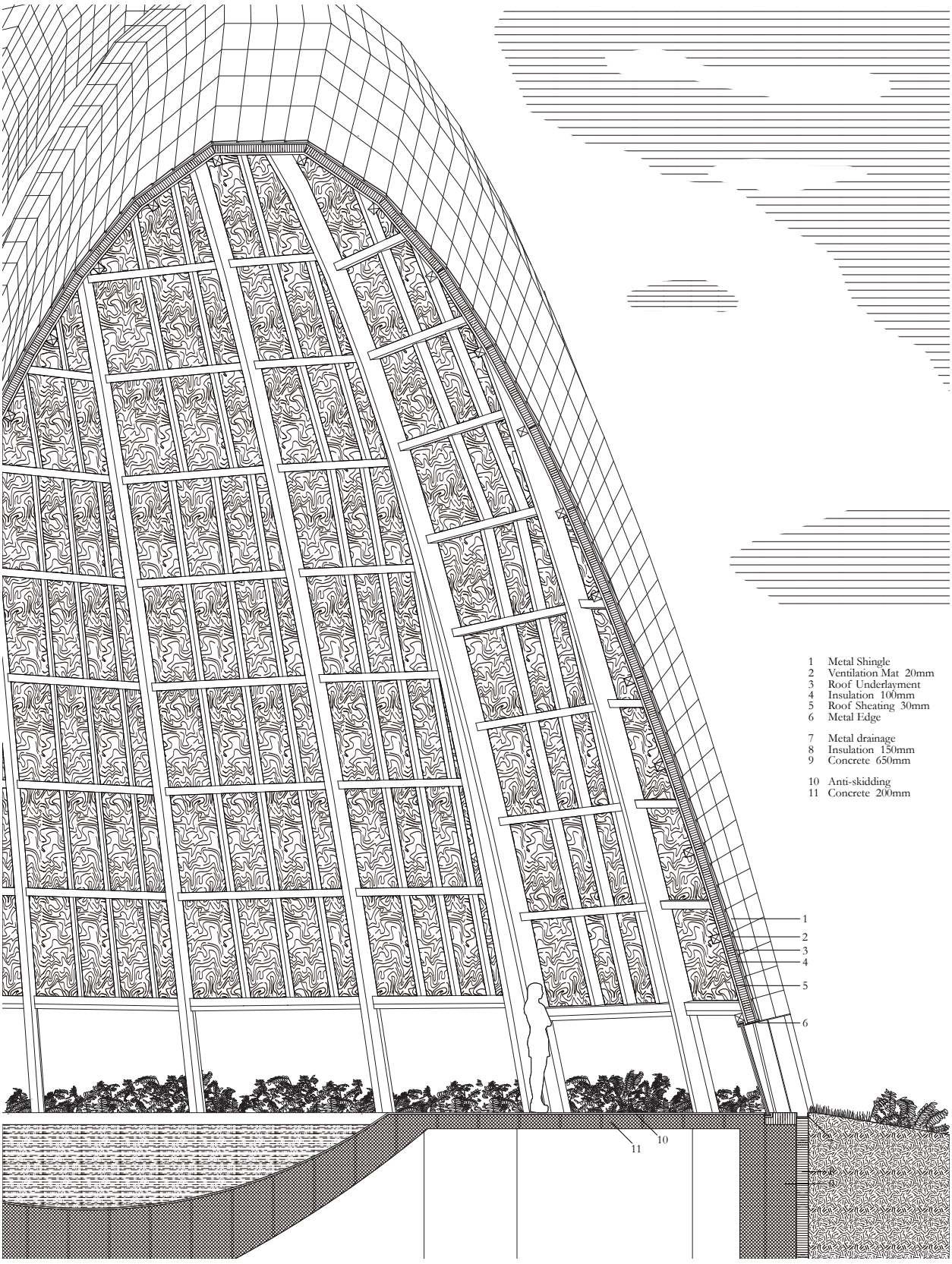


Fig.11. Construction Detail

Professor Martin Miller's elective called "Kinetic Facade" also discussed how to form a nature-like environment indoors. In the beginning, research of origami is required. Next, we need to apply the mechanism of the origami we researched to a façade installation. Our installation can change from a 2D square to a 3D cone by rotating corners, become part of the faces will overlap. We use mylar, which is a semi-transparent plastic, as the installation's material. In this way, when layers of mylar overlapping, the transparency will change. In other words, we can control the light intensity by this installation, so that we can keep the light in the building become milder. For instance, it can be like light in spring.

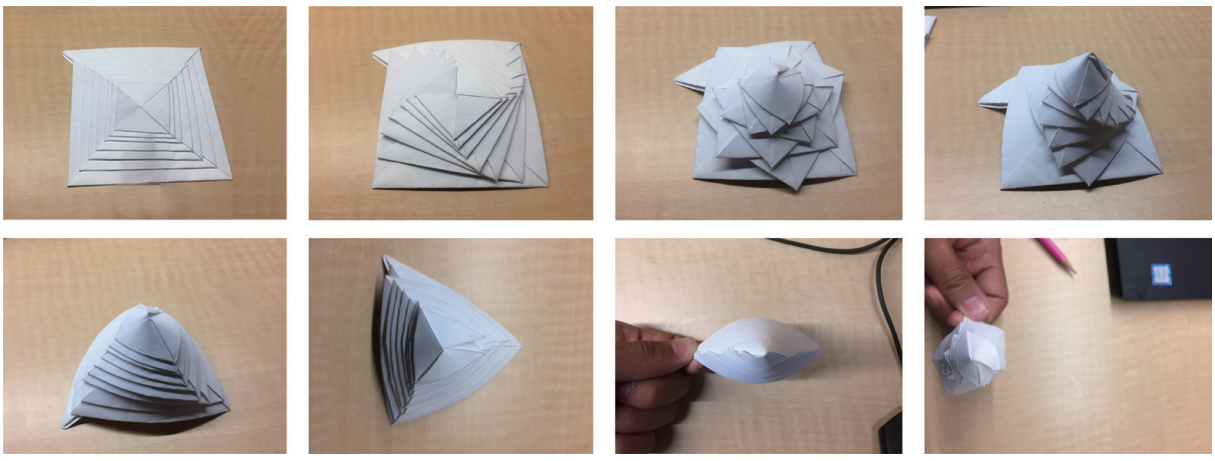
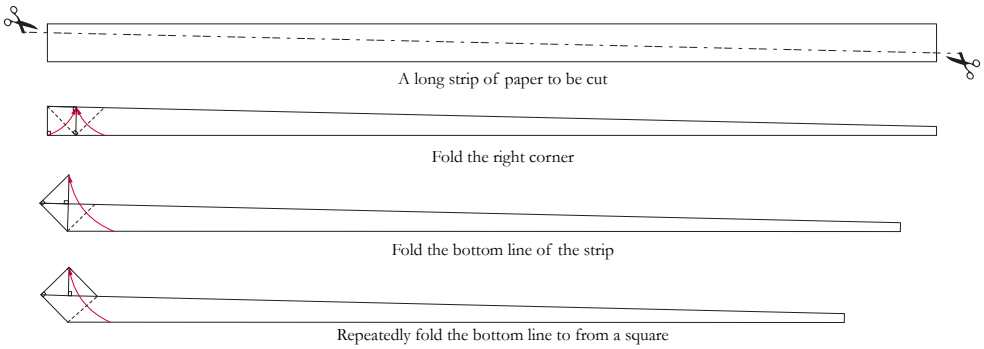


Fig.12. Origami Research

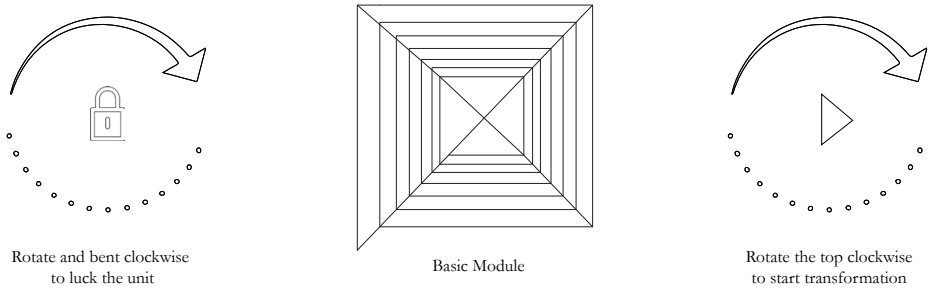
PART B: FOLDING FABRICATION

Kinetic Facade
Group members: Zijie Nie
Guoyu Wang
Binhan Tang
Junda Liu

Folding Process



Basic Module Formation



Transformation Process

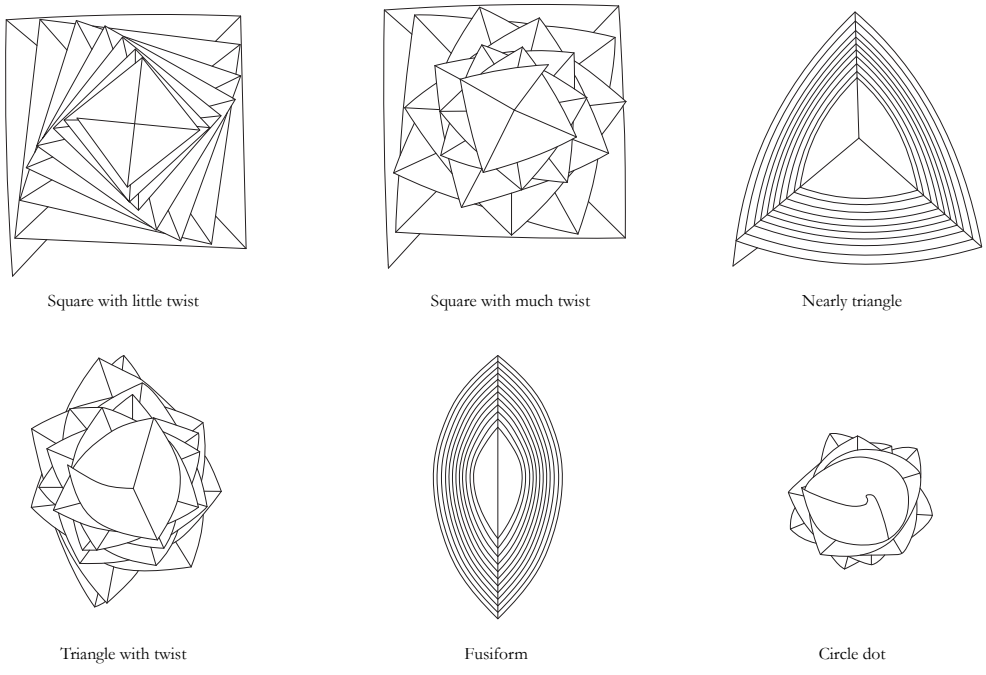


Fig.13. Origami Research

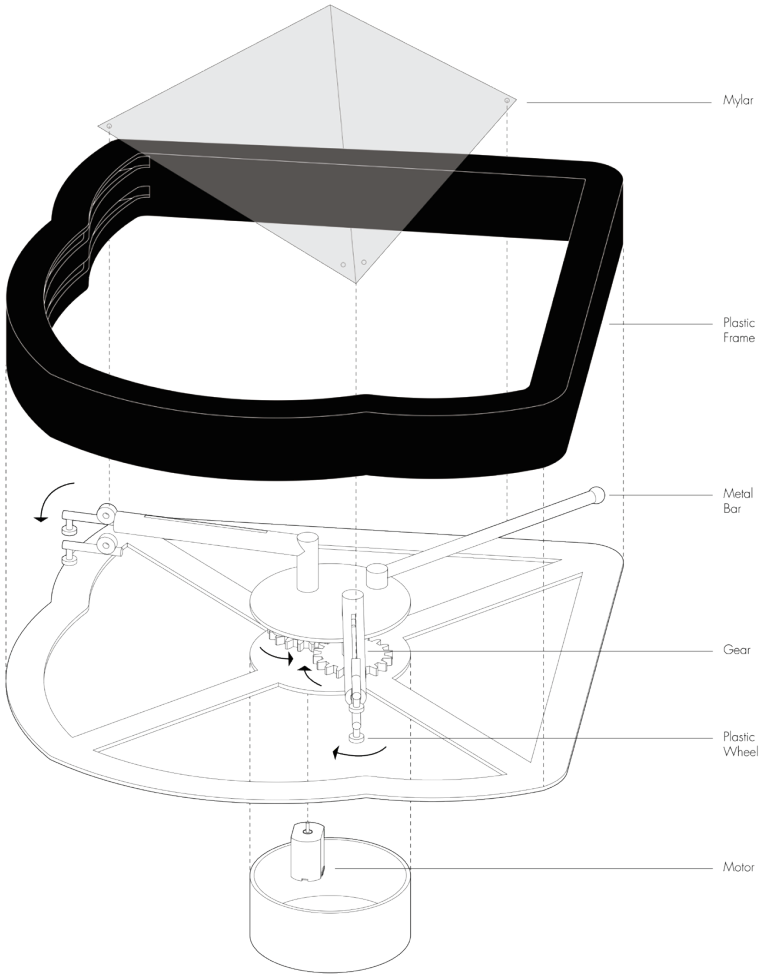


Fig.14. Mechanism

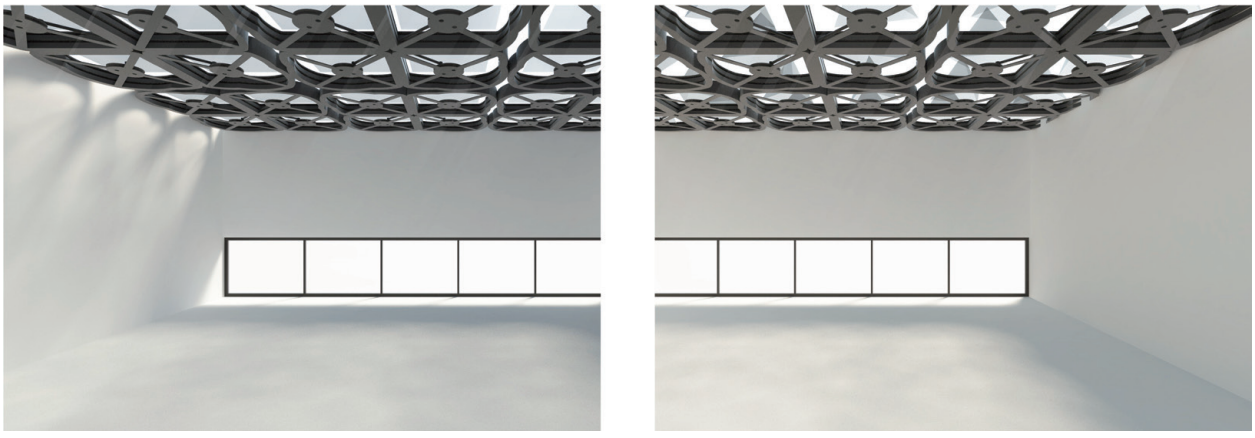


Fig.15. Change of Lighting Condition

4. Nature Occupies Building

Any kind of human intervention for nature inside architecture will make nature become captive of the architectural machine. In that condition, the infinite possibilities of nature will be erased. What we need to do is to sow a seed inside architecture and let it grow freely. As a result, the possibilities of nature can still be preserved. In other words, real nature needs to grow, so that borders, heights, and species of it will also change as time passes by. It is a dynamic process. Therefore, even if nature needs to occupy interior space in a physical way, it still needs to be “alive”. Otherwise, the combination of architecture and nature will only make nature become a less-natural thing.

In "Design Plan 5.0 of Industry after the Fall" studio, which was instructed by Aleksandr Mergold and Lori Khatchadourian, the site lies in one of the Armenian industrial cities—Charentsavan, which has a large abandoned industrial area. We decide to use walls of unused apartments to create new space inside deserted industrial buildings. In this case, the city’s resources can be better used, and the non-people space will be revived again. One of our strategies is to use these panels to form the first floor of industries as a new ground floor, because the original grounds of industries have been contaminated, which is not suitable for people to live. Thus, the original ground floor will be occupied by plants. As a result, nature will appear to be growing from inside of the buildings. Although the building is not in nature, nature is actually in it. This kind of reversal also can give people a feeling that they are both in nature and in a building.

Fig.16. Extract Panels from Residential Area

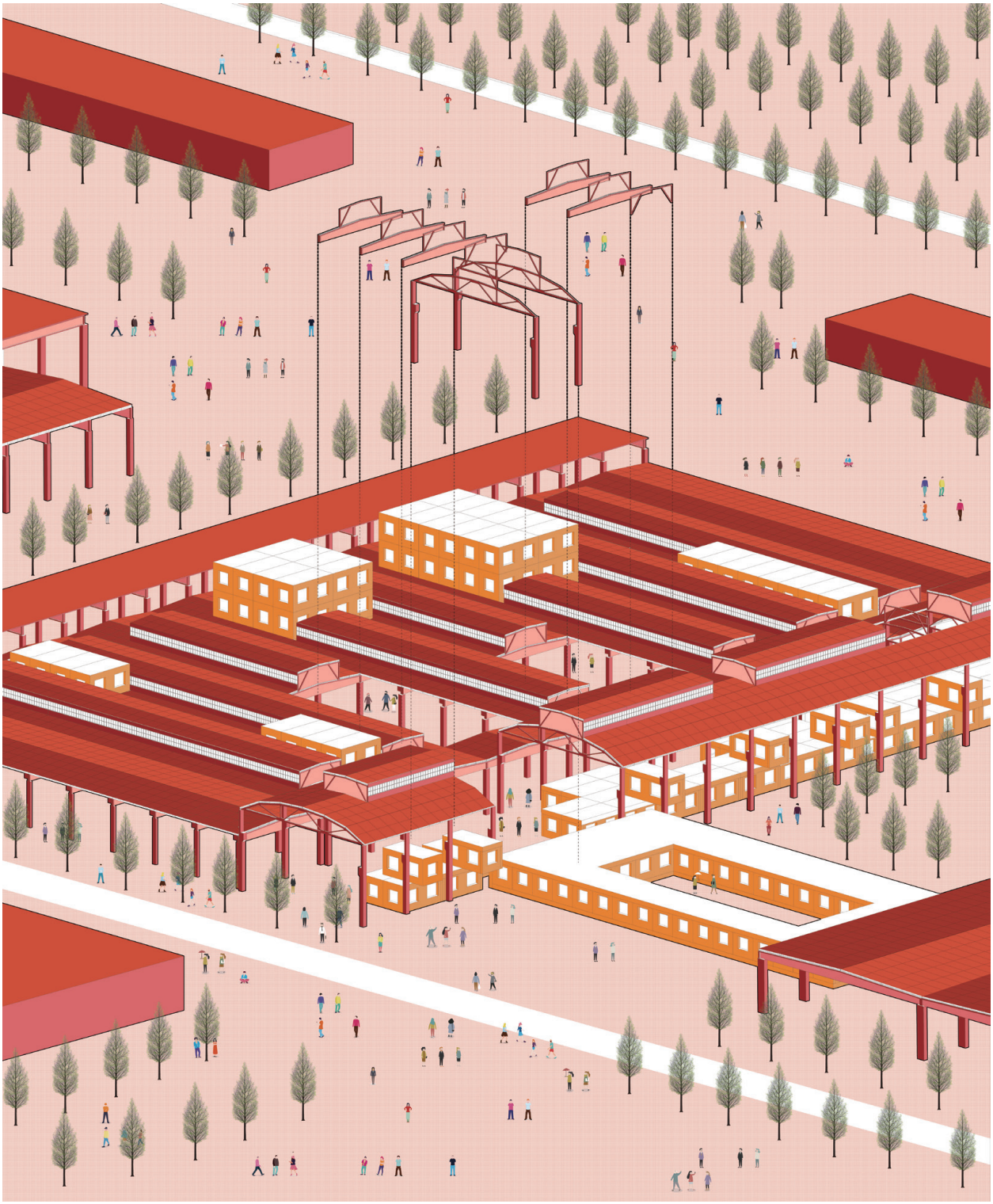


Fig.17. Extract Panels from Industrial Area

Fig.18. Industrial Building View

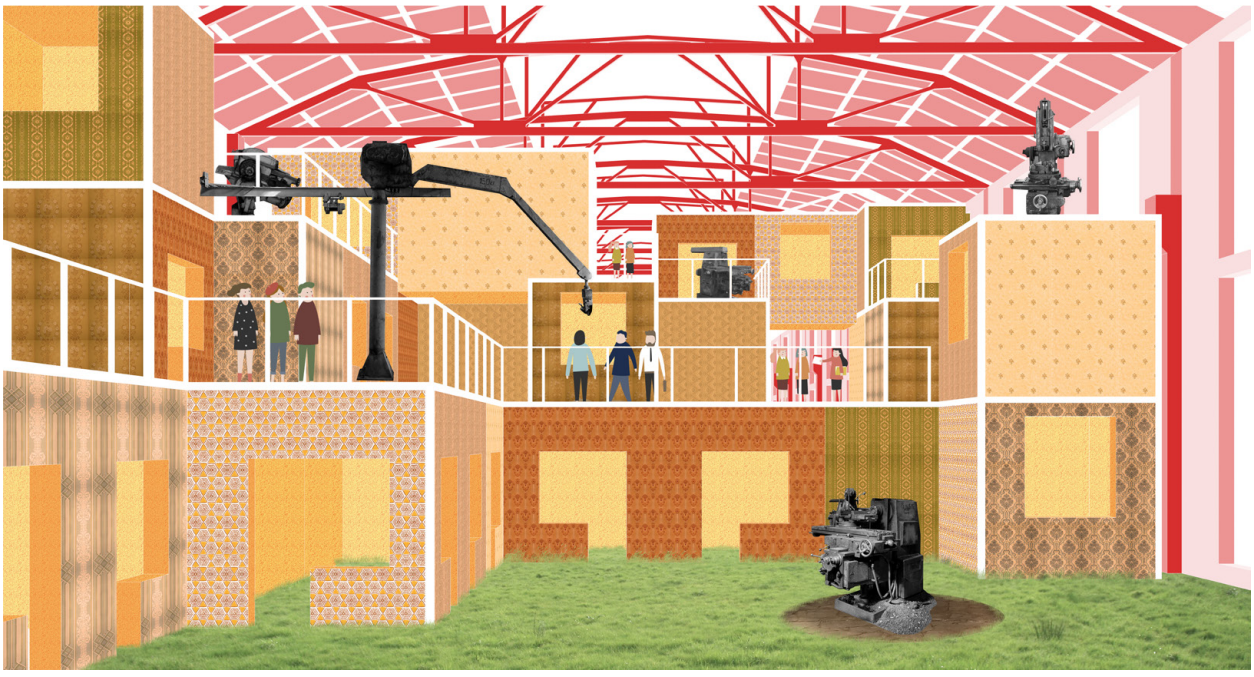


Fig.19. Industrial Building View

5. Conclusion

It is common that people use potted plants or courtyards to make interior space appear more natural. However, this kind of behavior will sometimes give people a feeling of falsity, which means they know they are in a building but not the natural world. The real interior natural space could make people confused about whether they are in a building or nature. On the other hand, even if they know where they are, they still may get the feeling of being inside nature. Moreover, using spatial operation to make an ecological building can only be done by architects. Therefore, it is meaningful to explore how to make the interior nature space. In this way, buildings can still be ecological enough by introducing natural space into it.

Bibliography

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